[002] This application is a national stage completion of PCT/EP2003/006734 filed June 26, 2003 which claims priority from German Application Serial No. 102 29 515.8 filed July 2, 2002.

[003] FIELD OF THE INVENTION

[004] The present invention relates to a transmission shift system for idler wheels ~~pursuant to the preamble of patent claim 1~~.

[005] BACKGROUND OF THE INVENTION

[010] ~~This objective is achieved pursuant to the invention through the features of patent claim 1. Further variations and advantages result from the dependent claims.~~

[011] SUMMARY OF THE INVENTION

[020] BRIEF DESCRIPTION OF THE DRAWINGS

[021] The invention ~~is explained in further detail in the following, based on the attached figures. They show~~ will now be described, by way of example, with reference to the accompanying drawings in which:

[030] DETAILED DESCRIPTION OF THE INVENTION

[035] In the axial direction, a second friction plate 4 is provided behind the idler wheel 3, the plate 4 comprising only one set of interior teeth 17' toward the shaft 9. On the sides of the friction plates 2, 4 that face away from the idler wheel 3, safety rings 7, 8 are provided, which support the friction plates 2, 4 in an axial direction. The friction plates 2, 4 contain a suitable friction coating on the friction surfaces.

[039] Fig. 3 shows a locking and synchronizing position of the transmission shift system. The piston chamber between the piston 1 and the piston carrier 5 is fed with pressure oil in this position. Moving the piston 1 eliminates the axial play between the idler wheel 3 and the respective friction plates 2, 4, and the friction plates 2, 4 are pushed against the safety rings [[6, 7]] 7, 8. Due to the friction torque acting in the circumferential direction between the idler wheel 3 and the friction plate 2, said plate is rotated against the piston 1 to its maximum rotational play. The chamfered teeth of the piston 1 rest against the chamfered teeth of the first friction plate 2, as illustrated in Fig. 4. In this locking and synchronizing position of the transmission shift system, shifting of the piston 1 is prevented.

1-15. (CANCELED)

16. (NEW) A transmission shift system comprising a synchronizing device for idler wheels, which can be actuated hydraulically and comprises at least one piston (1) that can mesh with a selected idler wheel (3) as a sliding sleeve, the piston (1) can be displaced axially on a shaft (9) by means of hydraulic actuation and is non-rotatably connected with the shaft (9), self-locking synchronization is provided, for the self-locking synchronization at least one friction plate (2, 4) comprising a friction surface facing the idler wheel (3) is provided, each friction plate (2, 4) comprises at least one set of interior teeth (17, 17'), which is provided for connection with the shaft (9).

17. (NEW) The transmission shift system according to claim 16, wherein the synchronizing device comprises a piston carrier (5) accommodating the piston (1), said carrier being non-rotatably connected to the shaft (9) and comprising a pressure oil feed line (10) so that a piston chamber between the piston (1) and the piston carrier (5) is provided, which can be supplied with pressure for hydraulically actuating the piston (1).

18. (NEW) The transmission shift system according to claim 16, wherein the piston (1) is designed as a step-shaped annular flange, which on an outside step comprises first interior teeth (12) for connecting with the idler wheel (3) and on an inside step comprises second interior teeth (13) for connecting with the shaft (9).

19. (NEW) The transmission shift system according to claim 16, wherein at least an end of the first interior teeth (12) of the piston (1) facing the idler wheel (3) is chamfered.

20. (NEW) The transmission shift system according to claim 16, wherein the idler wheel (3) comprises running gears (15) for positive connection with additional torque-transmitting elements and coupling teeth (16) for positive connection with the piston (1) and in that the idler wheel (3) is seated rotatably on the shaft (9).

21. (NEW) The transmission shift system according to claim 16, wherein in an axial direction between the piston (1) and the idler wheel (3), a first friction plate (2) with the interior teeth (17) and exterior teeth (18), is provided, which is chamfered at least on an end facing the piston (1).

22. (NEW) The transmission shift system according to claim 16, wherein a first friction plate (2) during a synchronizing phase is provided as a locking element resulting in a self-locking synchronizing device.

23. (NEW) The transmission shift system according to claim 16, wherein teeth of a first interior teeth (12) of the piston (1) can be guided through respective intermediate spaces between teeth of the exterior teeth (18) of the first friction plate (2) in the axial direction for shifting purposes so that the piston (1) that is connected to the shaft (9) can be positively connected to the idler wheel (3).

24. (NEW) The transmission shift system according to claim 16, wherein a second friction plate (4) is arranged on a side of the idler wheel (3) that faces away from the piston (1).

25. (NEW) The transmission shift system according to claim 16, wherein a third friction plate (11) is provided, which forms an outside plate, between an outside plate and a second friction plate (4), a fourth friction plate (19) is arranged, which forms an inside plate.

26. (NEW) The transmission shift system according to claim 16, wherein at least one return spring (6) is provided to return the piston (1) to its position.

27. (NEW) The transmission shift system according to claim 26, wherein several return springs (6) are provided, which are evenly distributed across a circumference of the piston (1).

28. (NEW) The transmission shift system according to claim 16, wherein at least one sealing element (21, 21') is provided between a piston carrier (5) and the piston (1) to seal a piston chamber.

29. (NEW) The transmission shift system according to claim 22, wherein interior teeth of the first friction plate (2) have play, in relation to the shaft (9), that is as large as an intermediate space between two adjoining teeth of first interior teeth (12).